TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. EN998082

In Re Application Of: **Boice et al.**

Serial No.	Filing Date	Examiner	Group Art Unit
09/255,892	02/23/99	An, Shawn S.	2613

Invention: **DYNAMICALLY SWITCHING QUANT MATRIX TABLES WITHIN AN MPEG-2 ENCODER**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

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Dated: May 03, 2004

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants: Boice et al.

Group Art Unit: 2613

Serial No.: 09/255,892

Examiner: An, Shawn S.

Filed: 02/23/1999

Appeal No.:

For: DYNAMICALLY SWITCHING QUANT MATRIX TABLES WITHIN AN MPEG-2 ENCODER

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Brief of Appellants

Dear Sir:

This is an appeal from a final rejection, dated January 14, 2004, rejecting claims 1-29, all the claims being considered in the above-identified application. This Brief is accompanied by a transmittal letter authorizing the charging of appellant's deposit account for payment of the requisite fee set forth in 37 C.F.R. §1.17(c).

Real Party In Interest

This application is assigned to **International Business Machines Corporation** by virtue of an assignment executed on February 16 & 18, 1999 by the joint inventors, and recorded with the United States Patent and Trademark Office at reel 009793, frame 00610, on February 23, 1999. Therefore, the real party in interest is **International Business Machines Corporation**.

Related Appeals and Interferences

To the knowledge of the appellant, appellant's undersigned legal representative, and the assignee, there are no other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the instant appeal.

Status of Claims

This patent application was filed on February 23, 1999, with the U.S. Patent and Trademark Office. As originally filed, the application contained twenty-nine (29) claims, of which three (3) were independent claims (i.e., claims 1, 18 & 29).

In an initial Office Action dated December 10, 1999, claims 1-3, 12, 18-20, and 25 were rejected under 35 U.S.C. §102(b) as being anticipated by Sasaki et al. (U.S. Pat. No. 5,530,478); claim 29 was rejected under 35 U.S.C. §102(e) as being anticipated by Wheeler et al. (U.S. Pat. No. 5,825,680); claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al. in view of Wheeler et al.; claims 5-6, 9, and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al.; claims 7-8, and 22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al. in view of Riek et al. (U.S. Pat. No. 5,987,179); claims 10-11, and 23-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al. in view of Katayama (U.S. Pat.

No. 5,422,736) and Wheeler et al.; and claims 13-17, and 26-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sasaki et al. in view of Hosono (U.S. Pat. No. 5,796,438). In Appellants' response mailed March 7, 2000, claims 1, 18 & 29 were amended.

In a telephonic interview conducted on April 27, 2000 between Examiner An, Examiner Lee, joint-inventor Boice, and joint-inventor Pokrinchak, it was agreed that the amended claim 1 overcame the previous claim 1 rejection under 35 U.S.C. §102(b) as being anticipated by Sasaki et al. It was further agreed that a new search was required.

In a final Office Action dated May 5, 2000, claim 29 was rejected under 35 U.S.C. §102(e) as being anticipated by Wheeler et al.; claims 1-4, 10-12, 18-20, and 23-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Katayama in view of Wheeler et al.; claims 5-6, 9, and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Katayama and Wheeler et al. as applied to claims 1 and 18, respectively, and further in view of Sasaki et al.; claims 7-8, and 22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Katayama and Wheeler et al. as applied to claims 1 and 18, respectively, and further in view of Riek et al.; and claims 13-17, and 26-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Katayama and Wheeler et al. as applied to claims 1 and 18, respectively, and further in view of Hosono. In Appellants' response mailed June 22, 2000, the grounds for rejection were traversed and reconsideration thereof was requested.

In an Advisory Action dated July 10, 2000, Appellants' response was considered, however the examiner maintained the grounds of rejection. A Notice of Appeal to the Board of Patent Appeals and Interferences was then filed on August 3, 2000. The Board of Patent Appeals and Interferences rendered an opinion on March 28, 2003, affirming the Examiner's rejection of originally filed claims 1-29.

In a Preliminary Amendment for a Continuing Prosecution Application filed with the U.S. Patent and Trademark Office on May 27, 2003, Appellants submitted amendments to independent claims 1, 18 & 29.

In an Office Action dated July 11, 2003, claims 1-4, 10-12, 18-20, 23-25 & 29 were rejected under U.S.C. §102(e) as being anticipated by Wheeler et al. (U.S. Patent No. 5,825,680); claims 5-6, 9 & 21 were rejected under U.S.C. §103(a) as being unpatentable over Wheeler et al. as applied to claims 1 and 18, respectively, and further in view of further in view of Hang et al. (U.S. Patent No. 5,710,595); claims 7-8, & 22 were rejected under U.S.C. §103(a) as being unpatentable over Wheeler et al. as applied to claims 1 and 18, respectively, and further in view of Riek et al. (U.S. Patent No. 5,987,179), and claims 13-17 & 26-28 were rejected under 35 U.S.C. §103(a), as being unpatentable over Wheeler et al. as applied to claims 1 and 18, respectively, and further in view of Hosono (U.S. Patent No. 5,796,438).

In Appellants' response mailed October 9, 2003, the grounds for rejection were traversed and reconsideration thereof was requested. No claims were amended. In a final Office Action dated January 14, 2004, Appellants' response was considered, however the examiner maintained the grounds of rejection.

A Notice of Appeal to the Board of Patent Appeals and Interferences was filed on March 4, 2004. The status of the pending claims is therefore as follows:

Allowed claims - none
Claims objected to - none
Claims rejected - 1-29
Claims canceled - none.

Appellant is appealing the rejection of claims 1-29.

Status of Amendments

The claims as set out in the Appendix include all prior entered claim amendments.

Summary of the Invention

The present invention recites a method, system and computer program product that allows for the encoding of a sequence of video data. The encode approach includes storing within a quantizer multiple sets of quantization matrix tables at the same time (e.g., 263, 264 of FIG. 6). The sets of quantization matrix tables are separate and independent (e.g., 270, 280 of FIG. 7), and each set comprises at least one intra-matrix table and at least one non intra-matrix table (see FIG. 7). As used herein, a "table" comprises multiple coefficients or entries, e.g., an 8x8 array of coefficients. A "set" of tables comprises two or more tables. Each set is recited to comprise at least one intra matrix table and at least one non-intra matrix table.

The quantizer (e.g., 250 of FIG. 6) quantizes the sequence of video data in a single pass using one set of the multiple sets of quantization matrix tables. Means (e.g., 261 of FIG. 6) are also provided for dynamically switching the quantizer from using the one set of quantization matrix tables to using another set of quantization matrix tables. See page 14, line 28 - page 17, line 7 of the specification. This dynamically switching occurs in real-time and occurs without requiring stopping of the encode process. Further, while one set of quantization matrix tables within the quantizer is employed, another set of quantization matrix tables is updated or modified within the quantizer.

Issues

1. Whether claims 1-4, 10-12, 18-20, 23-25 & 29 were anticipated by Wheeler et al. and, therefore, properly rejected under 35 U.S.C. §102(e).

2. Whether claims 5-6, 9 & 21 were obvious to one of ordinary skill in the art based on the teachings and suggestions of Wheeler et al. further in view of Hang et al. and, therefore, properly rejected under 35 U.S.C. §103(a).

3. Whether claims 7-8, & 22 were obvious to one of ordinary skill in the art based on the teachings and suggestions of Wheeler further in view of Riek et al. and, therefore, properly rejected under 35 U.S.C. §103.

4. Whether claims 13-17, & 26-28 were obvious to one of ordinary skill in the art based on the teachings and suggestions of Wheeler further in view of Hosono and, therefore, properly rejected under 35 U.S.C. §103.

Grouping of Claims

Since each ground of rejection provides a group of claims, the following groups of claims are included herein:

I. Claims 1-4, 10-12, 18-20, 23-25, and 29;
II. Claims 5-6, 9 and 21;
III. Claims 7-8 and 22; and
IV. Claims 13-17 and 26-28.

As understood, the claims of one group of claims do not stand or fall with the other group of claims, rather, each group of claims is decided independently of the other group of claims. Thus, appellants respectfully submit that the rejected claims do not stand or fall together.

Argument

Group I: Claims 1-4, 10-12, 18-20 and 23-25 & 29

As noted, claims 1-4, 10-12, 18-20, 23-25, & 29 (including independent claims 1, 18 & 29) stand rejected as anticipated by Wheeler et al. Reversal of this rejection is respectfully requested.

Wheeler et al. describe a method and apparatus for performing fast division in accordance with certain bandwidth requirements particular to an implementation described therein. A pseudo pipelined approach for performing division using the SRT non-restoring division algorithm is described, which uses a minor clock and a major clock cycle time. The number of stages in the division pipeline is a function of the parameters bandwidth requirements of the system. More particular to the present invention, the Office Action cites column 13, lines 28-32 of Wheeler et al. as relevant to the presently claimed invention. These lines describe a quantization unit 644 shown in FIG. 28. In the preferred embodiment, there are two quantization tables; i.e., one table is used when operating on intra-coded macroblocks, and the other table is used on non-intra-coded macroblocks. These quantization tables are stored in queue table RAMS 690. At column 13, lines 24-32, the patent states:

> ...In the preferred embodiment there are two quantization tables; one table is used when operating on intra-coded macroblocks, the other table is used on non-intra-coded macroblocks.
>
> As shown in FIG. 7, the quantization tables are stored in Q table RAMS 690. The CPU is responsible for loading all Q table entries. During encode and decode, the CPU loads the tables as required. Thus, the CPU is responsible for updating Q tables on video stream context switches.

Appellants respectfully submit that a careful reading of Wheeler et al. indicates that the patent is describing the MPEG standard which requires the use of an intra-coded matrix table and a non-intra-coded matrix table, and therefore requires a switching between the intra table and the non-intra table during the encoding process. The above-noted lines of column 13 of the patent would be read by one skilled in the art as referring to this switching between intra and non-intra tables at a context switch, e.g., a scene change.

Appellants invention recited in claim 29 (for example) includes computer readable program code means for storing multiple sets of quantization matrix tables within a quantizer at the same time, wherein each set of quantization matrix tables comprises a separate, independent set of tables, and each set comprises at least one intra matrix table and at least one non-intra matrix table. The present invention assumes a normal "real time" switching of intra and non-intra tables such as described in Wheeler et al., but further adds the ability to dynamically switch in real-time from one complete set of intra and non-intra tables to another complete set of intra and non-intra tables in a single pass without requiring stopping of the encoding process. Further, appellants' recited invention allows the updating of one set of quantization matrix tables within the quantizer while another set of quantization matrix tables is in use. Again, each set comprises at least one intra matrix table and at least one non-intra matrix table.

In appellants' invention, an enhancement is submitted whereby a user is allowed multiple sets of quantization matrix tables within the quantizer, with each set comprising at least one intra matrix table and at least one non-intra matrix table. By holding multiple sets of quantization matrix tables within the quantizer at the same time, and maintaining these tables separate and independent, appellants are able to allow for dynamic switching in real-time of complete sets of quantization matrix tables without requiring stopping of an encode process. Further, appellants allow for the dynamic updating of a set of

quantization matrix tables within the quantizer while another set of quantization matrix tables is in use by the quantizer.

A careful reading of Wheeler et al. fails to uncover any discussion of switching between complete sets of tables. The patent expressly teaches in a preferred embodiment there are two quantization tables. One table is for operating on intra-coded macroblocks, and the other table is used for non-intra-coded macroblocks. In contrast, appellants recite switching between full sets of tables, wherein one set comprises at least one intra matrix table and at least one non-intra matrix table. Thus, in appellants' approach, there are a minimum of four quantization tables within the quantizer at the same time between which the dynamic switching occurs.

Further, appellants' independent claims recite allowing updating of one set of quantization matrix tables of the multiple sets of quantization matrix tables within the quantizer while another set of quantization matrix tables is in use by the quantizer. For an alleged teaching of this concept, the Office Action references column 9, lines 25-36 of Wheeler et al. Appellants' respectfully submit that this reference mischaracterizes the teachings of Wheeler et al. The cited lines of Wheeler et al. address the MQUANT value, and the providing of a range of MQUANT values so that a user can select an appropriate MQUANT value to control the allocation of bits. As noted above, appellants independent claims define a single set of "quantization matrix tables" to comprise at least one intra-matrix table and at least one non-intra-matrix table. Based on this definition, the table of MQUANT values described by Wheeler et al. is distinct from appellants' recited "sets of quantization matrix tables". Again, the MPEG standard defines both "quantization matrix tables" and "MQUANT value" as separate concepts within the encoding process. For these reasons, the Office Action's characterization of the discussion in Wheeler et al. at column 9, lines 24-36 as relevant to appellants recited invention is respectfully traversed.

In view of the above, appellants respectfully submit that the independent claims presented herewith patentably distinguish over the teachings of Wheeler et al.

The dependent claims at issue are believed allowable for the same reasons as the independent claims, as well as their own additional characterizations. For example, claim 4 recites that the means for dynamically switching further comprises a table set register wherein the quantizer is adapted to control the switching of the quantizer from one set of quantization matrix tables to another set of quantization matrix tables. The Office Action alleges that the MQUANT register 692 in Wheeler comprises a conventional "table set register" with a function as recited by appellants in claim 4. This is respectfully traversed. The MQUANT register 692 is well known in the art for holding quantization step size. The register does not function or assist in switching between sets of matrix tables. Further, with respect to claim 12, a careful reading of Wheeler et al. fails to uncover any disclosure of the recited concept of dynamically changing quantization matrix tables of a presently unused set of quantization matrix tables of the multiple sets of tables, while still quantizing a sequence of video data using one set of tables or the other set of tables.

For the above reasons, appellants respectfully request reversal of the rejection to all claims of Group I.

Group II: Claims 5, 6, 9 & 21

Dependent claims 5, 6, 9 & 21 stand rejected as obvious over Wheeler et al. in view of Hang et al. Reversal of this rejection is also respectfully requested.

Hang et al. do not teach or suggest any of the above-noted deficiencies of Wheeler et al. when applied against the independent claims. Hang et al. is cited in the

Office Action for allegedly teaching a "default quantization matrix table". This characterization of Hang et al. is respectfully traversed.

As noted above, the encoding art and the MPEG encoding standard in particular, define the meaning of a "quantization matrix table". Further, a "quantization matrix table" is clearly distinct from an MQUANT value (QUANT value, Q-step) or a table of such values. The quantization matrix table contains certain information such as recited by appellants in the independent claims presented, which is distinct that from that of the MQUANT value. Hang et al. describe retrieving a default Q-step value from a table of default quantization step size values (see abstract). Thus, Hang et al. do not describe appellants' recited concept in claim 5, for example, of providing a "default quantization matrix table". Again, appellants' independent claims recite storage within a quantizer for holding multiple "sets of quantization matrix tables" at the same time, wherein each set of quantization matrix tables includes at least one "intra-matrix table" and at least one "non-intra-matrix table". Since the table of Q-step values in Hang et al. is employed in a different portion of the quantization process, appellants respectfully submit that there is no teaching in Hang et al. of appellants' further characterizations as set forth in the dependent claims at issue, and thus, that there is no suggestion in the combination of Hang et al. and Wheeler et al. for appellants' invention as recited in dependent claims 5, 6, 9 & 21.

For the above reasons, appellants respectfully request reversal of the obviousness rejection to all claims of Group II.

Groups III & IV: Claims 7-8, 13-17, 22 & 26-28

Dependent claims 7, 8 & 22 stand rejected as obvious over Wheeler et al. in view of Reik et al., while dependent claims 13-17 & 26-28 stand rejected as obvious over Wheeler et al. in view of Hosono. Reversal of these rejections is also respectfully

requested. A careful reading of both Reik et al. and Hosono fails to uncover any teaching or suggestion of the above noted deficiencies of Wheeler et al. when applied against appellants' independent claims.

Reik et al. is cited in the Office Action as disclosing utilizing custom quantization matrix tables, while Hosono is cited in the Office Action for outputting a "Q-matrix extension start code" in a compressed bit stream. Without acquiescing to the characterizations of the teachings of these patents, appellants' note that neither patent discloses or is cited for the basic deficiencies of Wheeler et al. when applied against the independent claims.

For the above reasons, appellants respectfully request reversal of the obviousness rejections to all claims of Groups III & IV.

Conclusion

Appellants herein request reversal of the 35 U.S.C. §102 rejection of claim 1-4, 10-12, 18-20 and 23-25 & 29, and reversal of the 35 U.S.C. §103 rejections of claims 5-9, 13-17, 21-22 and 26-28 set forth in the final Office Action. Appellants respectfully submit that their claimed invention was not anticipated by Wheeler et al., nor obvious to one of ordinary skill in the art based upon Wheeler et al. in combination, either with or without Hang et al., Riek et al., and Hosono. In support of their position regarding the claims, Appellants note that no applied patent uses multiple sets of quantization matrix tables to encode video in real time as recited in their independent claims. Wheeler et al. merely disclose the use of multiple tables, which is assumed in the present invention. Based upon these recitations, Appellants allege error in rejecting their claims as anticipated or obvious based upon the applied art.

Accordingly, reversal of all rejections is respectfully requested.

Respectfully submitted,

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Appendix

What is claimed is:

1. An encoder for encoding a sequence of video data, said encoder comprising:

storage within a quantizer for holding multiple sets of quantization matrix tables at the same time, wherein said multiple sets of quantization matrix tables comprise separate, independent sets of quantization matrix tables, each set of quantization matrix tables comprising at least one intra matrix table and at least one non-intra matrix table;

said quantizer for quantizing said sequence of video data in a single pass using at least one set of quantization matrix tables of said multiple sets of quantization matrix tables; and

means for dynamically switching in real time said quantizer during said single pass quantizing from using said one set of quantization matrix tables to using another set of quantization matrix tables of said multiple sets of quantization matrix tables, wherein said dynamically switching occurs without requiring stopping of the encoding process; and

means for allowing updating of said one set of quantization matrix tables of said multiple sets of quantization matrix tables within said quantizer while said another set of quantization matrix tables is in use by said quantizer.

2. The encoder of claim 1, wherein said means for dynamically switching comprises means for switching said quantizer from using said one set of quantizer matrix tables to using said another set of quantizer matrix tables at a picture boundary of said sequence of video data.

3. The encoder of claim 2, wherein said means for switching said quantizer at said picture boundary comprises means for switching from said one set of quantizer matrix tables to said another set of quantizer matrix tables without delaying encoding of said sequence of video data by said encoder.

4. The encoder of claim 3, wherein said means for dynamically switching further comprises a table set register within said quantizer adapted to control said switching of said quantizer from said one set of quantization matrix tables to said another set of quantization matrix tables.

5. The encoder of claim 1, wherein at least one table of said one set of quantization matrix tables comprises a default quantization matrix table pursuant to MPEG standard.

6. The encoder of claim 1, wherein multiple tables of said one set of quantization matrix tables comprise default quantization matrix tables pursuant to MPEG standard.

7. The encoder of claim 1, wherein at least one table of said another set of quantization matrix tables comprises a user's custom quantization matrix table.

8. The encoder of claim 1, wherein multiple tables of said another set of quantization matrix tables comprises a user's custom quantization matrix tables.

9. The encoder of claim 1, wherein each set of quantization matrix tables of said multiple sets of quantization matrix tables comprises at least one quantization matrix table, each quantization matrix table of said at least one quantization matrix table comprising one of a default quantization matrix table pursuant to MPEG standard or a user's custom quantization matrix table.

10. The encoder of claim 1, wherein each set of quantization matrix tables comprises an intra luminance table and a non-intra luminance table.

11. The encoder of claim 1, wherein each set of said multiple sets of quantization matrix tables comprises an intra luminance table, a non-intra luminance table, an intra chrominance table, and a non-intra chrominance table.

12. The encoder of claim 1, further comprising means for dynamically changing quantization matrix tables of a presently unused set of quantization matrix tables of said multiple sets of quantization matrix tables while quantizing said sequence of video data using said one set of quantization matrix tables or said another set of quantization matrix tables.

13. The encoder of claim 1, further comprising a compressed store interface for outputting a compressed bitstream produced by said encoder from said sequence of video data, said compressed store interface including means for dynamically outputting a quantization matrix extension start code in said compressed bitstream upon switching of said quantizer from using said one set of quantization matrix tables to using said another set of quantization matrix tables.

14. The encoder of claim 13, wherein said compressed store interface further comprises storage for also holding said multiple sets of quantization matrix tables.

15. The encoder of claim 13, wherein said means for dynamically outputting said quantization matrix extension start code comprises means for outputting said another set of quantization matrix tables in said compressed bitstream upon said quantizer switching from said one set of quantization matrix tables to said another set of quantization matrix tables.

16. The encoder of claim 13, wherein said means for dynamically outputting comprises means for outputting said quantization matrix extension start code in said compressed bitstream without pausing said encoding of said sequence of video data by said encoder.

17. The encoder of claim 13, further comprising means for changing quantization matrix tables in a presently unused set of said multiple sets of quantization matrix tables while said quantizer is quantizing said sequence of video data using said one set of quantization matrix tables or said another set of quantization matrix tables.

18. A method for encoding a sequence of video data, said method comprising:

providing storage within a quantizer of an encoder for holding multiple sets of quantization matrix tables at the same time, wherein said multiple sets of quantization matrix tables comprise separate, independent sets of quantization matrix tables, each set of quantization matrix tables comprising at least one intra matrix table and at least one non-intra matrix table;

quantizing the sequence of video data in a single pass using at least one set of quantization matrix tables of said multiple sets of quantization matrix tables; and

dynamically switching in real time said quantizing during said single pass from using said one set of quantization matrix tables to using another set of quantization matrix tables of said multiple sets of quantization matrix tables, wherein said dynamically switching occurs without requiring stopping of the encoding process; and

allowing updating of said one set of quantization matrix tables of said multiple sets of quantization matrix tables within said quantizer while said another set of quantization matrix tables is in use by said quantizer.

19. The method of claim 18, wherein said dynamically switching comprises switching said quantizing from using said one set of quantizer matrix tables to using said another set of quantizer matrix tables at a picture boundary of said sequence of video data.

20. The method of claim 19, wherein said switching of said quantizing at said picture boundary comprises switching from said one set of quantizer matrix tables to said another set of quantizer matrix tables without delaying encoding of said sequence of video data.

21. The method of claim 18, wherein at least one table of said one set of quantization matrix tables comprises a default quantization matrix table pursuant to MPEG standard or a user's custom quantization matrix table.

22. The method of claim 18, wherein at least one table of said another set of quantization matrix tables comprises a default quantization matrix table pursuant to MPEG standard or a user's custom quantization matrix table.

23. The method of claim 18, wherein each set of said multiple sets of quantization matrix tables comprises an intra luminance table and a non-intra luminance table.

24. The method of claim 18, wherein each set of said multiple sets of quantization matrix tables comprises an intra luminance table, a non-intra luminance table, an intra chrominance table, and a non-intra chrominance table.

25. The method of claim 18, further comprising dynamically changing quantization matrix tables of a presently unused set of quantization matrix tables of said multiple sets of quantization matrix tables while quantizing said sequence of video data using said one set of quantization matrix tables or said another set of quantization matrix tables.

26. The method of claim 18, further comprising producing a compressed bitstream employing a compressed store interface, said producing comprising dynamically outputting a quantization matrix extension start code in said compressed bitstream upon said switching from said one set of quantization matrix tables to said another set of quantization matrix tables.

27. The method of claim 26, wherein said dynamically outputting comprises outputting said quantization matrix extension start code in said compressed bitstream without pausing said encoding of said sequence of video data.

28. The method of claim 26, further comprising changing quantization matrix tables in a presently unused set of said multiple sets of quantization matrix tables while quantizing said sequence of video data using said one set of quantization matrix tables or said another set of quantization matrix tables.

29. An article of manufacture comprising:

a computer program product comprising computer usable medium having computer readable program code means therein for use in encoding a sequence of video data, said computer readable program code means in said computer program product comprising:

computer readable program code means for causing a computer to effect storing within a quantizer multiple sets of quantization matrix tables at the same time, wherein said multiple sets of quantization matrix tables comprise separate, independent sets of quantization matrix tables, each set of quantization matrix tables comprising at least one intra matrix table and at least one non-intra matrix table;

computer readable program code means for causing a computer to effect quantizing the sequence of video data in a single pass using at least one set of quantization matrix tables of said multiple sets of quantization matrix tables; and

computer readable program code means for causing a computer to effect dynamically switching in real time said quantizing during said single pass from using said one set of quantization matrix tables to using another set of quantization matrix tables of said multiple sets of quantization matrix tables,

wherein said dynamically switching occurs without requiring stopping of the encoding process; and

computer readable program code means for causing a computer to effect allowing updating of said one set of quantization matrix tables of said multiple sets of quantization matrix tables within said quantizer while said another set of quantization matrix tables is in use by said quantizer.